

wherein said synchronization circuit comprises:

a memory for storing each discrepancy time between a reference head and each head; and

a circuit for determining a time at which the head to which said switching is directed reads said position signal, in response to said head switching cue and synchronizing the time of said detection signal with said determined time,

and wherein said circuit reads a first discrepancy time between the reference head and a present head and a second discrepancy time between the reference head and the switched head; and calculates the time difference between said first and second discrepancy times to determine said time.

REMARKS

Attached hereto is a marked-up version of the changes made to the claims by the current amendment, captioned "Version with markings to show changes made."

Objections to Figs. 4 and 8 have been overcome by amendment, but the objection to Fig. 3 is not understood. An explanation is respectfully requested.

Claim 4 stands rejected under § 112. Claim 4 has been canceled, without prejudice, and features of claim 4 are now included in claim 1. This rejection has been addressed in amended claim 1 by reciting "time at which the switched head reads said position signal".

Claims 1-3, 5-10, 12 and 14 stand rejected under § 102 on the basis of Tigner. In addition, claims 4, 11 and 13 stand rejected under § 103 on the basis of Tigner. In

response, claims 1 and 8 have been amended by adding subject matter based on claims 2 and 4 and 9-11, respectively. Applicant respectfully traverses these rejections because Tigner does not disclose or suggest the claimed uses of discrepancy times defined in the claims of the present application.

Tigner discloses a servo control method for a staggered servo format (see col. 1, lines 54-59 and Fig. 2). That is, Tigner discloses the prior art technique shown in Fig. 14 of this application. Further, Tigner discloses FRAME COUNTER 540 and FRAME OFFSET defining the offset of the Ref-SGATE signal from timing mark detection in the servo field by TMD 520 (see col. 5, lines 5-50). In Tigner, FRAME OFFSET values vary as to each head, but are determined from base timing of the ref-index which is common to all heads and indicates a top of a FRAME PERIOD (see Figs. 4, 5, 6, 7, 8 and 9). In contrast, in this invention, as especially described in Fig. 2 and Fig. 4, memory 16 stores discrepancy times between a reference head and each head, and switching servo gate timing is performed by reading T_a between the reference head and the present head and T_b between the reference head and switched head and calculating the time difference $T_d (=T_a-T_b)$. The time difference T_b is then set as servo gate timing.


Head switching time can be reduced and fast head switching enabled in this invention.

For the foregoing reasons, applicants believe that this case is in condition for allowance, which is respectfully requested. The examiner should call applicants' attorney if an interview would expedite prosecution.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

Claims 2, 4, 9 and 11 were canceled, without prejudice.

Claims 1 and 8 were amended as follows:

1. (Amended) A head positioning control method for a storage disk device which comprises;

a storage disk that stores a position signal;

a plurality of heads that read information from the said storage disk;

an actuator that moves the said head; and

a control circuit that positions the said head based on the position signal read from the said storage disk using a selected head, said method comprising:

a step of synchronizing a time of a detection signal for detecting said position signal with a time of said position signal read by a selected head to which switching is directed, in response to a head switching cue; and

a step of reading said position signal for said switched head in response to said synchronized detection signal and positioning the said switched head according to said read position signal;

wherein said synchronizing step comprises:

a step of determining a time at which the switched head reads said position signal, in response to said head switching cue; and

a step of synchronizing the time of said detection signal with said determined time,

and wherein said determining step comprises:

a step of reading a first discrepancy time between a reference head and a present head and a second discrepancy time between the reference head and the switched head; and

a step of calculating the time difference between said first and second discrepancy times to determine said time.

8. (Amended) A head positioning control device for a storage disk apparatus, comprising:

a storage disk that stores position signals;

a plurality of heads that read information from the said storage disk;

an actuator that moves the said head; and

a control circuit that positions the said head based on the position signal read from the said storage disk using a selected head,

wherein said control circuit comprises:

a synchronization circuit that, in response to a head switching cue, synchronizes the time of the detection signal for detecting said position signal with the time of the position signal read by ~~the~~ a present head from which switching originates, and

a processing circuit that, in response to said synchronized detection signal, read the ~~said~~ position from the ~~said~~ present head and, in response to the read position signal, positions the ~~said~~ present head;

wherein said synchronization circuit comprises:

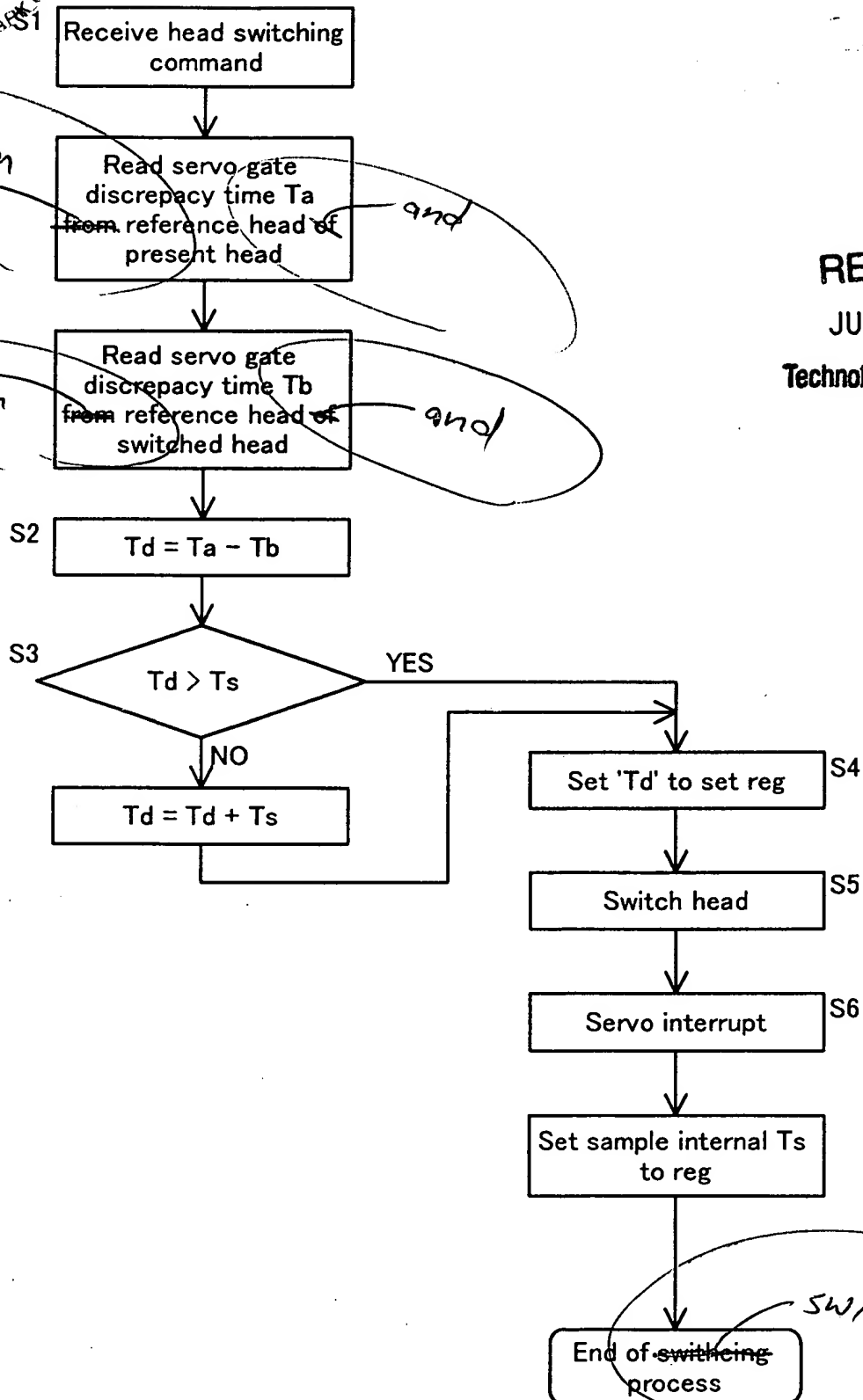
a memory for storing each discrepancy time between a reference head and each head; and

a circuit for determining a time at which the head to which said switching is directed reads said position signal, in response to said head switching cue and synchronizing the time of said detection signal with said determined time,

and wherein said circuit reads a first discrepancy time between the reference head and a present head and a second discrepancy time between the reference head and the switched head; and calculates the time difference between said first and second discrepancy times to determine said time.



FIG. 4



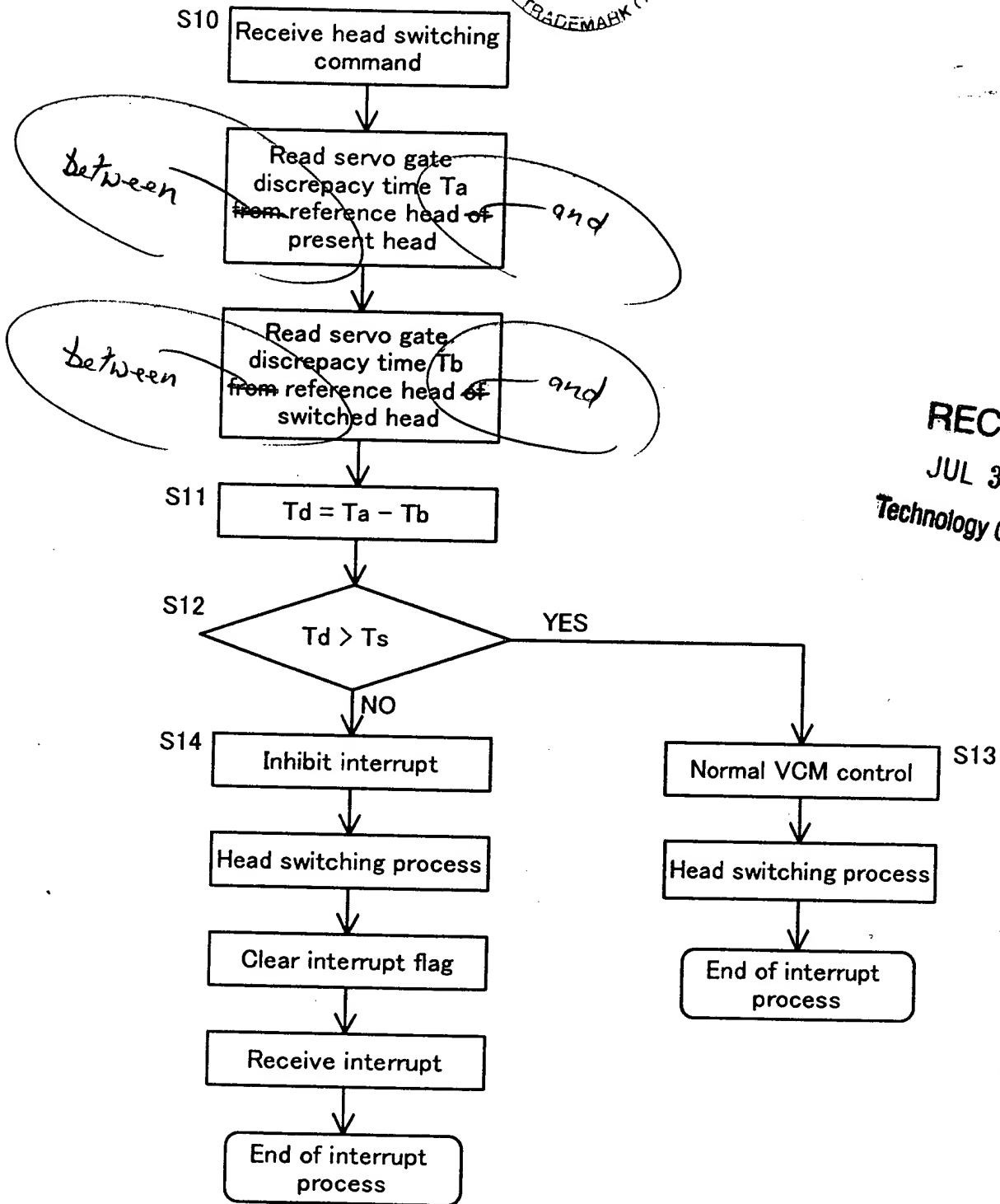
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FIG. 8



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